AMENDMENTS TO THE SPECIFICATION

The specification has been amended as follows:

Page 1

The following new heading has been added after line 5:

BACKGROUND OF THE INVENTION

The subheading at line 7 has been amended as follows:

~~TECHNICAL FIELD~~Field of the Invention

The subheading at line 13 has been amended as follows:

~~BACKGROUND ART~~Description of Related Art

Page 4

The paragraph at lines 4-10 has been amended as follows:

The present invention has been made in view of the circumstances above mentioned. Accordingly, ~~it is an object of~~ the present invention ~~to provide~~ provides a system that is capable of accurately measuring liquid fuel stored in a container. ~~Another object is to provide~~ The present invention also provides a liquid fuel quantity measurement method employing the measurement system.

Pages 4-5

The paragraph beginning on page 4, line 13 and ending on page 5, line 21 has been amended as follows:

~~To achieve the aforementioned objects, there is provided~~ One aspect of the present invention is to provide a first liquid fuel quantity measurement system. The first measurement system includes a first container for ~~interiorly~~ storing liquid fuel therein; pressure application means for raising air pressure within the first container by supplying air into the first container; and air-pressure measurement means for measuring the air pressure within the first container. The measurement system also includes a first pipeline through which the first container and the pressure application means communicate with each other; a second container connected with the first container; and a second pipeline through which the first container and the second container communicate with each other. The measurement system further includes feed means for feeding the liquid fuel within the first container into the second container through the second pipeline; detection means for detecting a reduction in the liquid fuel within the second container; and control means for controlling the feed means and the pressure application means by selecting either a pressure mode or a supply mode, based on information from both the air-pressure measurement means and the detection means. The measurement system further includes air-volume measurement means for measuring the volume of air supplied into the first container through the first pipeline by the pressure application means, and arithmetic means. During the pressure mode, the arithmetic means calculates the volume of the liquid fuel within the first container from both the volume of air measured by the air-volume measurement means and a quantity of change in air pressure calculated from the

air pressure within the first container measured by the air-pressure measurement means. During the supply mode, the arithmetic means calculates the volume of the liquid fuel within the first container from the number of times that the liquid fuel was fed from the first container into the second container.

Pages 5-6

The paragraph beginning on page 5, line 22 and ending on pages 6, line 24 has been amended as follows:

In accordance with the present invention, there is also provided a first liquid fuel quantity measurement method. The first measurement method includes a first container for ~~interiorly~~ storing liquid fuel therein; pressure application means for raising air pressure within the first container by supplying air into the first container; and a first pipeline through which the first container and the pressure application means communicate with each other. The measurement method further includes a second container connected with the first container; a second pipeline through which the first container and the second container communicate with each other; and feed means for feeding the liquid fuel within the first container into the second container through the second pipeline. When the air pressure within the first container is less than a predetermined pressure, air is supplied into the first container through the first pipeline by the pressure application means. Also, both the volume of the supplied air and a quantity of change in the air pressure within the first container due to the air supply are detected or

calculated, and the volume of the liquid fuel within the first container is calculated from both the volume of the supplied air and the quantity of change in the air pressure. When the liquid fuel within the second container is less than a predetermined quantity, a predetermined quantity of liquid fuel is fed from the first container into the second container through the second pipeline by the feed means, and the volume of the liquid fuel within the first container is calculated based on the number of times that the liquid fuel was fed.

Pages 7-8

The paragraph beginning on page 7, line 24 and ending on page 8, line 12 has been amended as follows:

In accordance with the present invention, there is provided a second liquid fuel quantity measurement method. The second measurement method includes a first container for ~~interiorly~~ storing liquid fuel therein; pressure application means for raising air pressure within the first container by supplying air into the first container; and a first pipeline through which the first container and the pressure application means communicate with each other. Air is supplied into the first container through the first pipeline by the pressure application means. Also, both the volume of the supplied air and a quantity of change in the air pressure within the first container due to the air supply are detected or calculated, and the volume of the liquid fuel within the first container is

calculated from both the volume of the supplied air and the quantity of change in the air pressure.

Page 9

The paragraph at lines 7-21 has been amended as follows:

In accordance with the present invention, there is provided a third liquid fuel quantity measurement method. The third measurement method includes a first container for ~~interiorly~~ storing liquid fuel therein; a second container connected with the first container; a second pipeline through which the first container and the second container communicate with each other; and feed means for feeding the liquid fuel within the first container into the second container through the second pipeline. In third measurement method, a predetermined quantity of liquid fuel is fed from the first container into the second container through the second pipeline by the feed means, and the volume of the liquid fuel within the first container is calculated based on the number of times that the liquid fuel was fed.

Page 12

The heading at line 24 has been amended as follows:

DETAILED DESCRIPTION OF THE ~~PREFERRED EMBODIMENTS~~INVENTION

Pages 12-13

The paragraph beginning on page 12, line 25 and ending on page 13, line 11 has been amended as follows:

Referring to Figs. 1 through 5, there is shown a construction machine with a liquid fuel quantity measurement system constructed in accordance with ~~a preferred embodiment~~ an embodiment of the present invention. The construction machine is made up of a traveling substructure 30, and a revolving superstructure 20 revolvably mounted on the traveling substructure 30 through a swivel joint 10. An engine 2 provided within the revolving superstructure 20 ~~drives~~ drives a hydraulic pump 19, which applies pressure to driving oil through which the entire construction machine is driven. Although not shown, the revolving superstructure 20 further includes a working arm, an actuator, a counter weight, an operator cab with a controller for controlling various devices, and so forth.

Pages 13-14

The paragraph beginning on page 13, line 12 and ending on page 14, line 5 has been amended as follows:

Also, the liquid fuel quantity measurement system according to the ~~preferred~~ embodiment is attached to a fuel feed pump, which feeds fuel from a main tank (first container) 3 to the engine 2 through an auxiliary tank (second container) 4. The liquid fuel quantity measurement system is used to measure the fuel quantity within the main

tank 3 and the fuel quantity within the auxiliary tank 4. The main tank 3 is constructed to store fuel that is supplied to the engine 2, and is provided in the traveling substructure 30. In addition, the main tank 3 is hermetically sealed to prevent leakage of fuel or air and entry of rain or water. On the other hand, the auxiliary tank 4 stores a definite quantity (a fixed quantity) of fuel to drive the engine 2 and is provided in the revolving superstructure 20 and communicates with the main tank 3 through a second pipeline 12. The fuel stored within the main tank 3 is fed into the auxiliary tank 4 through the second pipeline 12, in which a definite quantity (a fixed quantity) of fuel is temporarily stored. The fuel within the auxiliary tank 4 is reliably supplied to the engine 2.

Pages 14-15

The paragraph beginning on page 14, line 18 and ending on page 15, line 10 has been amended as follows:

The second pipeline 12 is provided ~~with the second~~ with a second pipeline valve (supply shut-off valve) 14. If the second pipeline valve 14 is opened, fuel is supplied from the main tank 3 to the auxiliary tank 4. On the other hand, if the second pipeline valve 14 is closed, the fuel supply to the auxiliary tank 4 is stopped and the fuel flow from the main tank 3 is prevented. Similarly, the first pipeline 13 is provided ~~with the first~~with a first pipeline valve (supply shut-off valve) 15. If the first pipeline valve 15 is opened, air is supplied from the air pump (pressure application means) 6 to the main tank 3. On the other hand, if the first pipeline valve 15 is closed, the air supply to the main

tank 3 is stopped and the air flow from the main tank 3 to the air pump 6 is prevented. The first pipeline valve 15 and second pipeline valve 14 are opened or closed by the controller 11, and they are normally closed. If the air pump 6 feeds air to the main tank 3 through the first and second pipelines 13 and 12, air is accumulated within the main tank 3 and therefore the pressure within the main tank 3 is increased.

Pages 15-16

The paragraph beginning on page 15, line 24 and ending on page 16, line 16 has been amended as follows:

The controller 11 is used to control the operation of the air pump 6, first pipeline valve 15, and second pipeline valve 14. That is, the controller 11 controls the direction and quantity that air and fuel flow, by controlling the operation of the air pump 6 and opening or closing the first and second pipeline valves 15 and 14, in dependence on input signals from the float sensor 9 and pressure sensor 5. Thus, the controller 11 is able to control the quantity ~~that fuel is fed~~ of fuel fed from the main tank 3 into the auxiliary tank 4. When the pressure within the main tank 3 detected by the pressure sensor 5 is less than a predetermined value, the air pump 6 is operated and the first pipeline valve 15 is opened, whereby the pressure within the main tank 3 is increased. On the other hand, when the pressure within the main tank 3 detected by the pressure sensor 5 is equal to or greater than the predetermined value, the air pump 6 is stopped and the first pipeline

valve 15 is closed. The control means 11 also contains arithmetic means 7, which is used for calculating the quantity of fuel within the main tank 3.

Page 17

The paragraph at lines 3-9 has been amended as follows:

Fig. 2 shows how fuel control is performed by the liquid fuel quantity measurement system of the ~~preferred~~ embodiment. The steps shown in the figure is dependent on the main flow (not shown) that is carried out by the controller 11, so they are repeatedly carried out when necessary. Also, the following steps are performed by the controller 11.

The paragraph at lines 10-25 has been amended as follows:

In step S110, it is judged if the pressure P_1 (atm) within the main tank 3 detected by the pressure sensor 5 is equal to or greater than a first prescribed pressure P_{min} (predetermined pressure). When P_1 is equal to or greater than the first prescribed pressure P_{min}, the controller 11 executes step 120 and those that follow (a supply mode) in which the fuel supply from the main tank 3 to the auxiliary tank 4 is controlled. When P_1 is less than the first prescribed pressure P_{min}, the controller 11 executes ~~step 120~~ step 210 and those that follow (a pressure mode) in which the pressure within the main tank 3 is increased by the air pump 6. Note that the first prescribed pressure P_{min} is set as a

value such that the fuel within the main tank 3 is automatically supplied by the difference in pressure between the main tank 3 and the auxiliary tank 4.

Pages 18-19

The paragraph beginning on page 18, line 23 and ending on page 19, line 22, has been amended as follows:

The volume of air supplied into the main tank 3 equals the volume of air discharged from the air pump 6. Therefore, as indicated by a discharge rate performance graph for the air pump 6 shown in Fig. 6, there is a corresponding relationship between the discharge rate and discharge pressure of the air pump 6. Hence, if a map is previously made based on such a corresponding relationship (see Fig. 6), a discharge rate per unit time can be calculated in dependence on the pressure (which is the discharge pressure of the air pump 6 and corresponds to the pressure within the main tank 3) detected by the pressure sensor 5, using this map. If such a discharge rate is calculated at predetermined cycles (e.g., 0.3 sec), and the discharge rates during the period from the operation start of the air pump 6 to the operation stop are added up, the volume of air supplied into the main tank 3 can be calculated. That is, in the ~~preferred~~ embodiment, the pressure sensor 5, and the corresponding map (storage means) between the discharge pressure (i.e., the raised pressure within the main tank 3) and discharge rate of the air pump 6, constitute air-volume measurement means that measures (or judges) the volume of air supplied into the first container by the pressure application means. The pressure

sensor 5 is also used as raised-pressure measurement means that measures the discharge pressure of the air pump 6 (raised pressure within the main tank 3).

Page 20

The paragraph at lines 2-9 has been amended as follows:

In the ~~preferred~~ embodiment, the air-volume measurement means is made up of the pressure sensor 5 for measuring the raised pressure, and the corresponding map in which the corresponding relationship between the raised pressure and the volume of air supplied into the main tank 3 is stored. However, a flow meter may be provided in the first pipeline 13 to directly measure the volume of air supplied into the main tank 3.

Pages 22-23

The paragraph beginning on page 22, line 16 and ending on page 23, line 4 has been amended as follows:

In step S140, it is judged if the fuel ~~quantity~~ quantity V_{fs} within the auxiliary tank 4 is equal to or greater than a second prescribed quantity V_{max}. When it is equal to or greater than the second prescribed quantity V_{max}, step S150 is performed. When it is less than the second prescribed quantity V_{max}, step S140 is repeated until it reaches the second prescribed quantity V_{max}. The second prescribed quantity V_{max} is a value that represents a target upper limit value for the fuel liquid surface within the auxiliary tank 4

that can feed fuel without influencing operation of the engine 2. Step S140 is repeated until the fuel liquid surface exceeds the target upper limit value. If the fuel liquid surface exceeds this target upper limit value, step S150 is performed. In step S150, the second pipeline valve 14 is closed. And step S160 is performed.

Page 23

The paragraph at lines 5-14 has been amended as follows:

In step S160, after fuel has been fed from the main tank 3 into the auxiliary tank 4, the fuel quantity within the main tank 3 is calculated. This calculation is performed mainly by the arithmetic means 7. In the ~~preferred~~ embodiment, the number N of times that a fixed quantity of fuel was supplied from the main tank 3 into the auxiliary tank 4 is counted. And if a fuel supply quantity per one time is multiplied by the number N, the total of fuel supply quantities from the main tank 3 into the auxiliary tank 4 can be calculated.

Page 24

The paragraph at lines 3-5 has been amended as follows:

With the above-described fuel control, the liquid fuel quantity measurement system according to the ~~preferred~~ embodiment has the following advantages:

Page 28

The paragraph at lines 2-6 has been amended as follows:

While the present invention has been described with reference to the ~~preferred~~ embodiment thereof, the invention is not to be limited to the details given herein, but may be modified within the scope of the invention hereinafter claimed.

The paragraph at lines 7-12 has been amended as follows:

In the ~~preferred~~ embodiment, the controller 11 operates between the supply mode and the pressure mode. That is, the controller 11 selects one of the two modes to control the first pipeline valve 15, second pipeline valve 14, and air pump 6. However, the controller 11 may be operated only in either mode.

The paragraph at lines 13-18 has been amended as follows:

For instance, a liquid fuel quantity measurement system shown in Fig. 3 ~~is characterized in that it~~ has only the pressure mode described in the ~~preferred~~ embodiment shown in Fig. 1. Note that the same parts as the ~~preferred~~ embodiment are represented by the same reference numerals.

Page 30

The paragraph at lines 1-5 has been amended as follows:

A liquid fuel quantity measurement system shown in Fig. 4 ~~is characterized in that it~~ has only the supply mode described in the ~~preferred~~ embodiment shown in Fig. 1. Note that the same parts as the ~~preferred~~ embodiment are represented by the same reference numerals.